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EXAMINER

CANTELMO, GREGG

ART UNIT PAPER NUMBER

1745

DATE MAILED: 04/10/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/019,483

Applicant(s)

BENCZUR-UERMOESSY ET AL.

Examiner

Gregg Cantelmo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-58 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 30-58 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 May 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other: _____

DETAILED ACTION

Response to Preliminary Amendment

1. In response to the preliminary amendment received May 13, 2002:
Claims 1-29 have been cancelled. New claims 30-58 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The information disclosure statement filed December 30, 2001 has been placed in the application file and the information referred to therein has been considered as to the merits.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the tie rod must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The disclosure is objected to because of the following informalities:

a. The first paragraph of page 1 recites "Claim 1" and "Claim 27". Currently there are no claims 1 or 27 and if the application is allowed, claims 1 and 27 may not be drawn to the same subject matter of original claims 1 and 27. It is suggested that Applicant delete the "..., in accordance with the preamble of claim ... preamble of Claim 27" in the first paragraph of page 1 to overcome this objection. This also applies to the third paragraph of page 3

Appropriate correction is required.

6. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

- a. The specification fails to recite the capacitance limitations of claims 34 and 35;
- b. The specification fails to recite the negative electrode arrangement of claim 36;
- c. The specification fails to recite the tar-like coating of claim 44;
- d. The specification fails to recite the rubber coating of claim 45;
- e. The specification fails to recite felt bodies of claim 46;
- f. The specification does not clearly recite the method of claims 56 or 58.

For example the specification does not recite the following: filling the subcells

with electrolyte before the subcells are assembled (claim 56) or flushing without hydrogen (claim 58).

Applicant should carefully review all claims for proper antecedent basis in the specification for all claimed subject matter.

Claim interpretation

7. The preamble of claim 30 has not been accorded patentable weight in light of claim 31. While the preamble of claim 30 recites a Ni/metal hydride battery, the body of the claim fails to specify any materials which would limit the body of the claim to Ni/metal hydride batteries nor does any limitation in the body of claim 30 refer back to the preamble language wherein such materials would be required by the body. Such would further appear to be the case considering claim 31 positively defines the battery to be a Ni/metal hydride battery. Thus the examiner has interpreted claim 30 as set forth above. If applicant argues that claim 30 must be limited to Ni/metal hydride batteries see item 9 below.

8. With respect to claim 58, the term "without pressure" may be misleading. All gases have an inherent pressure and the hydrogen gas being used to flush the battery has an inherent pressure and therefore is not "without pressure." The term has been interpreted to mean that the pressure of the gas is at ambient pressure. Clarity is respectfully requested.

Claim Objections

9. Claim 31 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. If the preamble of claim 30 is argued by applicant as required, then claim 31 would not be held to further limit claim 30, since the preamble recites the limitations set forth in claim 31.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claims 1-55 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim recites "electrolyte in an amount determined by the porosity of the electrodes and separator." The instant application does not clearly recite this relationship and the limitation is regarded as new matter.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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13. Claims 30-55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. Claim 30 recites the limitation "the porosity of the electrodes and separator" in lines 8-9. There is insufficient antecedent basis for this limitation in the claims. In particular there is no antecedent basis for the electrodes and separator having porosity. Applicant is advised to amend the term "the porosity" to "a porosity" to overcome this rejection;
- b. Claims 40 and 41 appear to be out of scope with the limitations of claim 30. Claim 30 recites that the stack is "within" the gas space. Claims 40 and 41 recite that the gas space is at the center of the stack. If the stack is within the gas space as recited in claim 30, then the configuration of claims 40 and 41 appear to be beyond the scope of this arrangement since the stack of claims 40 and 41 is not within the gas space but instead the gas space is within the stack;
- c. Claim 47 recites the limitations "the active compound" in line 3, "the contact side" in line 4. There is insufficient antecedent basis for this limitation in the claim.
- d. Claim 47 recites the phrase "the individual plates or discs" in lines 5-6, it is unclear as to which plates or discs the term "the individual plates or discs" are drawn to (all or some of the plates or discs). Clarity is respectfully requested;

- e. Claim 50 recites the limitation "the two end plates" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. There is no clear definition of end plates in claims 30 or 50. This also applies to claim 55;
- f. Claim 55 recites the limitation "the load" in line 2. There is insufficient antecedent basis for this limitation in the claim. There is no clear recitation of the term "load" prior to the definite recitation above.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 30, 31, 33, 39, 42, 43, 46, 47, 50 and 57 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 4,567,981 (Lim).

Lim discloses a Ni/metal hydride battery of bipolar stack design (abstract and Figs. 1 and 2) comprising: a plurality of subcells (11, 12, 13 ...) disposed in a gastight casing housing (col. 3, ll. 60-64) and pressed against each other via end plates 36 and 38 (Fig. 1 and col. 4, ll. 37-51), each subcell including: positive electrode 44 and negative electrode 40 (Fig. 2 and col. 4, ll. 65-68), a separator 42 disposed between respective positive and negative electrodes (Fig. 1 and col. 4, ll. 65-68), electrolyte provided to the cell wherein the separator and electrodes are porous and have electrolyte disposed therein and the amount of electrolyte provided is inherently

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determined by the porosity of the separator and electrodes (col. 5, line 36 through col. 6, line 42), an electrically conductive wall 50 or 52 positioned between adjacent subcells, the walls separating the electrolytes of the two adjacent subcells and electrically connecting the electrodes of the two adjacent cells (Fig. 2 and col. 6, ll. 43-50 and col. 8, ll. 3-18), a common gas space 16 in which the cells are disposed (Fig. 1 and col. 5, ll. 25-28), two pressure plates 36 and 38 functioning as current-discharge poles between which the subcells (11, 12, 13 ...) are disposed, wherein the subcells are permanently pressed against one another via bolt assemblies in an elastic manner (Fig. 1 and col. 4, ll. 37-51 as applied to claim 30). The degree of elasticity of claim 30 is unspecified and the materials of the prior art have an inherent degree of elasticity permitting the materials to be pressed together as the bolt assemblies are tightened.

The battery is a Ni/metal hydride battery (abstract, col. 5, ll. 36-40 and col. 6, ll. 1-8 as applied to claims 30 and 31).

The positive electrode 44 has an addition 48 which is a porous conductor and therefore increases conductivity (Fig. 2 and col. 5, ll. 1-4 as applied to claim 33).

The negative electrode 40 is porous and thus has a structure which allows gases to pass through it (Fig. 2 and col. 6, ll. 1-8 as applied to claim 39).

At least one sealing ring 54 is disposed between each subcell (11, 12, 13 ...) and the common gas space 16 (Figs. 1 and 2) and the rings prevent passage of electrolyte between adjacent cells but permit gas passage via gas channels 56 (Fig. 2 as applied to claim 42).

The ring includes polytetrafluoroethylene which has pore 56 for gas passage and is therefore porous (Fig. 2 and col. 8, ll. 3-18 as applied to claim 43).

The subcells have a nickel felt body which acts as a store for excess electrolyte (col. 6, ll. 22-42 as applied to claim 46).

The electrodes 40 and 44, separators 42 and walls 50 are in the form of plates stacked in the common gas space 16 (Figs. 1 and 2) the negative electrode 40 being having the active layer 41 on one side of the electrode 40 (Fig. 2) and the positive electrode 40 has no active material thereon since it is separated from the negative active material layer 41 by separator 42 (as applied to claim 47). Also the parts are cylindrical and flat (plates as shown in Fig. 2) and therefore are also discs (col. 5, ll. 29-35).

The two end plates 36 and 38 are fixed via bolts 29 and 31 and the tightening of the bolts exerts a pressing force against the subcells (Fig. 1 and col. 4, ll. 37-51 as applied to claim 50).

Lim discloses a method of producing a battery (abstract and Figs. 1 and 2) comprising: a disposing a plurality of subcells (11, 12, 13 ...) in a gastight casing housing (col. 3, ll. 60-64) and pressing the subcells against each other via end plates 36 and 38 (Fig. 1 and col. 4, ll. 37-51), wherein each subcell has positive electrode 44 and negative electrode 40 (Fig. 2 and col. 4, ll. 65-68) and a separator 42 disposed between respective positive and negative electrodes (Fig. 1 and col. 4, ll. 65-68), impregnating the separator with a predetermined amount of electrolyte (col. 5, ll. 48-50), disposing an

electrically conductive wall 50 or 52 between two adjacent subcells, to separate the electrolytes of the two adjacent subcells and to provide an electrical connection between the electrodes of the two adjacent cells (Fig. 2 and col. 6, ll. 43-50 and col. 8, ll. 3-18), connecting a common gas space 16 to the cells via pore 56 (Fig. 1 and col. 5, ll. 25-28), disposing the subcells between two pressure plates 36 and 38 functioning as current-discharge poles, the electrodes, separators and walls are plate shaped (Fig. 2 and col. 5, ll. 29-35) placing the plates in a stack (Fig. 1) and pressing the plates together via bolts 29 and 31 during assembly (Fig. 1 and col. 4, ll. 37-51 as applied to claim 57).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S. patent No. 4,844,999 (Oshitani).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The difference between claim 32 and Lim is that Lim does not specify the positive electrode material to be a fibrous-structure electrode filled with nickel hydroxide active compound.

The positive electrode of Lim is nickel or a hydroxide (col. 5, ll. 36-47) formed on a porous substrate.

Oshitani discloses of positive electrodes including a fibrous structure electrode filled with a nickel hydroxide active compound (abstract). The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

The motivation for using a positive electrode material to be a fibrous-structure electrode filled with nickel hydroxide active compound is that it would have provided a high density cell with long operating life and further improved the ratio of utilization of the active material (abstract)

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by using a positive electrode material to be a fibrous-structure electrode filled with nickel hydroxide active compound since it would have provided a high density cell with long operating life and further improved the ratio of utilization of the active material. Furthermore selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination.

18. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S. patent No. 5,032,475 (Hasebe).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The difference between the instant claims and Lim are that Lim does not disclose of the negative electrode having a higher capacitance than the positive electrode (claim 34) wherein the capacitance of the negative electrode is 150% to 250% of the capacitance of the positive electrode (claim 35).

The hydrogen absorbing alloy negative electrode accommodated in the enclosure and comprised of a conductive core and a layer formed on the conductive core and made of a mixture hydrogen absorbing alloy powder and carbon black having a specific surface area of $700 \text{ m}^2/\text{g}$ or more, and having a capacity 1.0 to 2.5 times the sum of the capacity of the nickel hydroxide contained in the positive electrode and the electricity required to oxidize the cobalt monoxide powder, a separator made of synthetic resin unwoven fabric having a texture size of 50 to 100 g/m^2 and a thickness of 0.1 to 0.25 mm, and located between the positive electrode and the negative electrode, and alkali electrolyte contained in the enclosure (paragraph bridging columns 2 and 3 of Hasebe).

It is preferred that the negative electrode 2 has a capacity equal to 1.0 to 2.5 times the sum of a nickel hydroxide capacity of the non-sinter type nickel positive electrode 1 and an amount of electricity required for oxidization of the cobalt monoxide. This is because an increase in the inner pressure will hardly be controlled at the early stage of a charge and discharge cycle operation if the capacity of the negative electrode is less than 1.0 time that of the positive electrode. Also, if the capacity of the negative

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electrode exceeds 2.5 times that of the positive electrode, the accommodating size of the positive electrode in a given volume of the enclosure will be reduced by an increase in the size of the negative electrode. Consequently, the higher energy storage will be no more expected and the use of a large amount of the hydrogen absorbing alloy powder which is costly will raise the production cost (col. 6, ll. 10-26 of Hasebe).

As apparent from Table 2, the nickel-metal hydride secondary cells of Examples 12 to 14 provided with the hydrogen absorbing alloy negative electrodes having a capacity equal to 1.0 to 2.5 times the sum of the nickel hydroxide capacity of the positive electrode and the electricity needed for oxidization of the cobalt monoxide are improved in the operative life, lasting more than 500 cycles. Particularly, the life of the cells of Example 13 and 14 are highly increased ensuring over 800 cycles of charge and discharge operation (col. 16, ll. 40-60).

The motivation for providing a negative electrode having a higher capacitance than the positive electrode (claim 34) wherein the capacitance of the negative electrode is 150% to 250% of the capacitance of the positive electrode (claim 35) is that it would have improved the charge and discharge characteristics of the subcells and increased the life of the cells.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by providing a negative electrode having a higher capacitance than the positive electrode (claim 34) wherein the capacitance of the negative electrode is 150% to 250% of the capacitance of the

positive electrode (claim 35) since it would have improved the charge and discharge characteristics of the subcells and increased the life of the cells.

19. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of either U.S. patent No. 4,051,305 (Benczur-Urmossy) or U.S. patent No. 5,585,142 (Klein '142).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The hydrogen storage alloy layer 41 faces the separator 42 (Fig. 2 of Lim as applied to claim 37).

The difference between claim 36 and Lim is that Lim does not explicitly disclose of the negative electrode comprising a plastic bonded hydrogen storage alloy.

The negative electrode of Lim is a three dimensional structure which is porous (col. 6, ll. 1-8 of Lim).

While plastic bonding is a process, the process employs binding agents and thus further defines the composition of the electrode.

The technique of the synthetic plastic binding or bonding of electrodes has found at first its acceptance in the fuel cell technique because it permits the manufacture of very thin electrodes and because some binding agents frequently possess at the same time desired hydrophobic characteristics. However, also iron- and nickel-oxide electrodes for secondary batteries are known in the art which have been pressed or rolled with the use of organic binding agents. In addition to graphite powder, iron or

nickel powder was used as conductive substance, depending on the type of the electrode (col. 2, ll. 8-19 of Benczur-Urmossy).

Klein '142 discloses of a method of fabricating plastic-bonded electrodes using active material having enhanced electronic conductivity. The desired result is an electrode of comparable or improved performance to electrodes which use sintered or foam plaques that are expensive as compared to electrodes manufactured using the subject low-cost plastic bonded process. The desired result is achieved by coating the active material with an ultra-thin conductive skin which enhances the electronic conductivity of the finished electrode (col. 4, ll. 38-48).

The motivation for plastic bonding the electrode is that it permits the manufacture of very thin electrodes having hydrophobic characteristics.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by plastic bonding the electrode since it would have permitted the manufacture of very thin electrodes and having hydrophobic characteristics.

20. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S. patent No. 4,215,184 (Gutmann).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The difference between claim 38 and Lim is that Lim does not explicitly disclose of asymmetrical pasting of the active material.

It is known to apply non-symmetrical catalyst coatings to electrodes used in nickel cells (Gutmann col. 5, ll. 30-45)

The motivation for applying an asymmetrical pasting of the active material is to improve the thermal conductivity of the electrode (abstract).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by applying an asymmetrical pasting of the active material since it would have improved the thermal conductivity of the electrode.

21. Claims 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S. patent No. 4,888,256 (Zuckerbrod).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The differences between the instant claims and Lim are that Lim does not explicitly disclose of the walls having a tar-like coating material on its edges to prevent the electrolyte from leaking (claim 44) or that each wall has a rubber coating on its edges to prevent the electrolyte from leaking through (claim 45).

The term "tar-like" has been interpreted as any coating which effectively provides the same function as required by the claim. Note that the instant application fails to clearly define what the invention appreciated as "tar-like" materials at the time the claimed invention was made and thus is open to reasonable interpretation.

Lin teaches of the desire to isolate the electrolytic solution of each subcell so as to prevent the formation of parasitic shunt currents (col. 2, ll. 56-64). Thus there is a clear desire to ensure the sealing of these cells.

Zuckerbrod is drawn to intercell separators 12 disposed between adjacent subcells (Fig). The separator 12 employs edge sealing with an adhesive resistant to the electrolyte such as neoprene or an epoxy based adhesive (col. 3, ll. 22-28). The adhesive is held to be "tar-like" since it has adhesive properties and forms an effective edge seal for the intercell separator 12 (as applied to claim 44). Neoprene is an exemplary rubber material (as applied to claim 45)

The motivation for providing a adhesive (i.e. tar-like) neoprene (i.e. rubber) coating on the edges of the walls is to improve the sealing characteristics of the wall between subcells to effectively isolate the electrolytic solutions of each subcell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by providing a adhesive (i.e. tar-like) neoprene (i.e. rubber) coating on the edges of the walls since it would have improved the sealing characteristics of the wall between subcells and effectively isolated the electrolytic solutions of each subcell.

22. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S patent No. 5,618,641 (Arias).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The difference between claim 48 and Lim is that Lim does not explicitly disclose compressing the bipolar array under a pressure from 10 to 35 N/cm².

Arias discloses that it is known to apply compressive pressures to bipolar cell stacks including an upper limit of 20 psi which is about 13.7 N/cm² (see col. 3, ll. 5-25). Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919, F.2d 1575, 16 USPQ 2d 1934 (Fed. Cir. 1990).

The motivation for applying a compressive pressure is to optimize the battery life and power of the cell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by applying a compressive pressure of 20 psi is to optimize the battery life and power of the cell.

23. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S patent No. 5,552,243 (Klein '243).

The teachings of claim 30, with respect to Lim, have been discussed above and are incorporated herein.

The difference between claim 49 and Lim is that Lim does not explicitly disclose providing an elastic element as a pressure-exerting component for pressing the subcells together.

Klein '243 discloses that a rubber material 15 can be disposed in the stack to allow for electrode expansion and irregularities in the stack (col. 6, ll. 15-27).

The motivation for providing an elastic element as a pressure-exerting component for pressing the subcells together is that it allows for electrode expansion and irregularities in the stack.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by providing an elastic element as a pressure-exerting component for pressing the subcells together since it would have allowed for electrode expansion and irregularities in the stack.

24. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of Zuckerbrod and U.S. patent No. 4,977,043 (Kadouchi).

The teachings of claims 44 and 45 have been discussed above, incorporated herein.

The difference not yet discussed is of the edges or boundary surfaces of the walls having a hydrophobic coating that includes one or more bituminous substances of good adhesion.

Zuckerbrod teaches that the edge portions of the wall separating adjacent cells comprises a hydrophobic adhesive material (col. 3, ll. 3-18 and 22-28). Zuckerbrod does not specify the adhesive material to be a bituminous substance.

Bituminous seals or gaskets are well known in the art of electrochemical cells for the ability to provide excellent seals for the electrochemical cell. In the context of Zuckerbrod, one of ordinary skill in the art would have found it obvious to use a bituminous substance as the sealant since it would have effectively sealed the components as desired by Lin and Zuckerbrod.

Kadouchi discloses that asphalt (a bituminous substance) is employed as a sealing adhesive in an electrochemical cell (col. 7, ll. 27-35).

The motivation for using a bituminous substance as an adhesive sealing material is that it would have provided a means for improved sealing of adjacent cells and prevented electrolyte bridging between the cells. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lin by using a bituminous substance as an adhesive sealing material since it would have provided a means for improved sealing of adjacent cells and prevented electrolyte bridging between the cells.

25. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S. patent No. 5,618,641 (Arias).

Lim discloses a method of producing a battery (abstract and Figs. 1 and 2) comprising: a disposing a plurality of subcells (11, 12, 13 ...) in a gastight casing

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housing (col. 3, ll. 60-64) and pressing the subcells against each other via end plates 36 and 38 (Fig. 1 and col. 4, ll. 37-51), wherein each subcell has positive electrode 44 and negative electrode 40 (Fig. 2 and col. 4, ll. 65-68) and a separator 42 disposed between respective positive and negative electrodes (Fig. 1 and col. 4, ll. 65-68), impregnating the separator with a predetermined amount of electrolyte (col. 5, ll. 48-50), disposing an electrically conductive wall 50 or 52 between two adjacent subcells, to separate the electrolytes of the two adjacent subcells and to provide an electrical connection between the electrodes of the two adjacent cells (Fig. 2 and col. 6, ll. 43-50 and col. 8, ll. 3-18), connecting a common gas space 16 to the cells via pore 56 (Fig. 1 and col. 5, ll. 25-28), disposing the subcells between two pressure plates 36 and 38 functioning as current-discharge poles, the electrodes, separators and walls are plate shaped (Fig. 2 and col. 5, ll. 29-35) placing the plates in a stack (Fig. 1) and pressing the plates together via bolts 29 and 31 during assembly (Fig. 1 and col. 4, ll. 37-51 as applied to claim 56).

The difference between claim 56 and Lim is that Lim does not explicitly disclose filling the subcells with electrolyte before the subcells are assembled.

The electrolyte in each subcell is isolated from the other subcells in the stack.

The motivation for filling the subcells with electrolyte before the subcells are assembled.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by filling the subcells with electrolyte before the subcells are assembled.

26. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim in view of U.S. patent No. 3,959,018 (Dunlop).

Lim discloses a method of producing a battery (abstract and Figs. 1 and 2) comprising: a disposing a plurality of subcells (11, 12, 13 ...) in a gastight casing housing (col. 3, ll. 60-64) and pressing the subcells against each other via end plates 36 and 38 (Fig. 1 and col. 4, ll. 37-51), wherein each subcell has positive electrode 44 and negative electrode 40 (Fig. 2 and col. 4, ll. 65-68) and a separator 42 disposed between respective positive and negative electrodes (Fig. 1 and col. 4, ll. 65-68), impregnating the separator with a predetermined amount of electrolyte (col. 5, ll. 48-50), disposing an electrically conductive wall 50 or 52 between two adjacent subcells, to separate the electrolytes of the two adjacent subcells and to provide an electrical connection between the electrodes of the two adjacent cells (Fig. 2 and col. 6, ll. 43-50 and col. 8, ll. 3-18), connecting a common gas space 16 to the cells via pore 56 (Fig. 1 and col. 5, ll. 25-28), disposing the subcells between two pressure plates 36 and 38 functioning as current-discharge poles, the electrodes, separators and walls are plate shaped (Fig. 2 and col. 5, ll. 29-35) placing the plates in a stack (Fig. 1) and pressing the plates together via bolts 29 and 31 during assembly (Fig. 1 and col. 4, ll. 37-51 as applied to claim 56).

The difference between claim 56 and Lim is that Lim does not explicitly disclose evacuating and filling the battery by flushing with hydrogen without pressure.

As discussed above, the phrase without pressure has been interpreted to be atmospheric pressure.

It is known in the art to evacuate a secondary cell and vent the chamber with hydrogen at near atmospheric pressure (1 atm, see column 2, ll. 15-18). Such low-pressure operation

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919, F.2d 1575, 16 USPQ 2d 1934 (Fed. Cir. 1990).

The motivation for evacuating and filling the battery by flushing with hydrogen without pressure.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Lim by evacuating and filling the battery by flushing with hydrogen without pressure

Allowable Subject Matter

27. Although claims 40, 41 and 52-55 are rejected under 112 first paragraph. None of the prior art of record are considered to teach, fairly suggest or render obvious the arrangements specified in claims 40, 41 or 52-55.

With respect to claim 40: The subcells of Lim form a stack as shown in Figs. 1 and 2. Gas is introduced to the cells from peripheral channels 56. There is no teaching or suggestion of a gas space at the center of the stack and one of ordinary skill in the art would not have found it obvious to modify the teachings of Lin in this manner.

With respect to claim 52: The subcells of Lim form a stack as shown in Figs. 1 and 2 however there battery of Lim does not disclose or suggest a stack having a central passage and wherein the individual subcells are connected to the passage by porous connecting elements.

Each subcell has separate gas flow channels connected to input lines 26 and exhaust lines 28 (Fig. 1). There is no central passage taught by Lim nor is there ample motivation within Lim or the remaining prior art of record for altering the configuration of Lim to have the central passage and wherein the individual subcells are connected to the passage by porous connecting elements.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a

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general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc


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